NOAA NESDIS
CENTRAL SATELLITE DATA PROCESSING CENTER

Microwave Humidity Sounder (MHS) Level 1b Format Differences

Version 1.4

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1 Purpose

This document lists the modifications made to the current release of the MHS 1b format (dated June 13, 2003) to create the newest release of this format.

2 Header Record Modifications

- To ensure proper word alignment, "<Zero Fill>" fields at byte offsets 179, 1727, and 1743 were changed from 4-byte to 2-byte integers, with their corresponding word sizes updated to maintain the same overall field size.
- Defined new field, "Offset between Start of Scan and Center of First FOV", in bytes 109-110. (These were spare bytes.) It is a single two-byte integer, and is the time, in milliseconds, between the start of the scan and the center of the scan's first FOV. It is included to aid a user in converting a 1b's scan line time back to the value as originally reported by the spacecraft.
- Changed bit 0 of the "Earth Location Bit Field" (byte offset 503-504) from "attitude error correction (0=not corrected; 1=corrected)" to "constant attitude error correction (0=not performed; 1=performed)". Defined bit 2, which was previously undefined, as "dynamic attitude error correction (0=not performed; 1=performed)".
- Removal of NOAA-K-specific "new" bias correction fields: changed "'New" Bias Correction Values' field, to spare (combining it with the end-of-record filler).
- The following fields, related to Metop maneuvers, were added in the filler area at the end of the header record:
    - "Start of Maneuver Year" (byte offset 1753-1754).
    - "Start of Maneuver Day of Year" (byte offset 1755-1756).
    - "Start of Maneuver UTC Time of Day" (byte offset 1757-1760).
    - "End of Maneuver Year" (byte offset 1761-1762).
    - "End of Maneuver Day of Year" (byte offset 1763-1764).
    - "End of Maneuver UTC Time of Day" (byte offset 1765-1768).
    - "Change in Spacecraft Velocity" (byte offset 1769-1780).
    - "Spacecraft Mass" (byte offset 1781-1788).

3 Data Record Modifications

- To ensure proper word alignment, the following changes were made:
    - In the science data record, the field "Scan Line Quality Flags [Calibration Problem Code]" (byte offset 30-31) changed from a single 2-byte unsigned integer to two 1-byte unsigned integers.
    - In the science data record, a 2-byte "<Zero Fill>" field inserted before the "Computed OBCT Temperatures" field. This increased the starting byte of the fields "Computed OBCT Temperatures", "Science Packet Spare Words", and "<Zero Fill>" by 2. The number of words in the "<Zero Fill>" field just before the "Main Bus Select Status" field reduced from 3 to 1. Thus, the starting byte of all subsequent fields, beginning with the "Main Bus Select Status", remains unchanged.
    - In the extended test data record, the "<Zero Fill>" field at starting byte 2767 changed from a 17-word, 4-byte integer to a 34-word, 2-byte integer.

- Removal of NOAA-K-specific "new" bias correction fields: redefined bits 5 and 6 of "Quality Indicator Bit Field" (bytes offset 25-28) as spare.
- Added a new field, "Total Applied Attitude Correction" (bytes 191-196). It is located in what were spare bytes. The preceding spare (zero fill) field decreased in size from 16 bytes (bytes 181-196) to ten bytes (bytes 181-190).
- Added the following two new navigation-related field. They are located in what were spare bytes. The preceding spare (zero fill) field decreased in size from 16 bytes (bytes 181-196) to four bytes (bytes 181-184) to accommodate these new fields.
    - "Computed Yaw Steering" (bytes 185-190)
    - "Total Applied Attitude Correction" (bytes 191-196)
- Defined the following bits, which were previously undefined (zero fill), of "Navigation Status Bit Field" (bytes 197-200):
    - bits 20-19: "yaw steering parameters usage indicator"
    - bit 18: "Metop maneuver indicator"
    - bit 17: "earth location at the satellite subpoint is accurate and reasonable"
- For correctness, consistency, and clarity, references to "Local azimuth angle" in the "Angular Relationships" field (byte offset 213-752) changed to "Relative azimuth angle".

4 Other Modifications

- To ensure all MHS packet data is maintained, even if its content is unable to be determined, defined a new data record type: "Unknown Packet Data".